

Peter A. York
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Education

Ph.D. in Engineering Sciences, Harvard University, May 2020

Dissertation: *Millimeter-Scale Robotics: Fabrication, Actuation, and Medical Devices*

Advisor: Robert J. Wood

M.S. in Engineering Sciences, Harvard University, May 2017

B.Eng in Mechanical Engineering, Vanderbilt University, May 2014, Summa Cum Laude

Journal Articles

- [J1] H. Wang, **P. A. York**, Y. Chen, S. Russo, T. Ranzani, C. Walsh, and R. J. Wood, “Biologically-inspired electrostatic artificial muscles for insect-sized robots,” 2021, In review.
- [J2] **P. A. York**, R. Peña, D. Kent, and R. J. Wood, “Microrobotic laser steering for minimally invasive surgery,” *Science Robotics*, vol. 6, no. 50, 2021.
- [J3] **P. A. York**, N. J. Jafferis, and R. J. Wood, “Millimeter-sized piezoelectric flextensional actuators with improved mechanical efficiency,” *Sensors and Actuators A: Physical*, p. 112 066, 2020.
- [J4] **P. A. York**, N. T. Jafferis, and R. J. Wood, “Meso scale flextensional piezoelectric actuators,” *Smart Materials and Structures*, vol. 27, no. 1, p. 015 008, 2017.
- [J5] P. J. Swaney, **P. A. York**, H. B. Gilbert, J. Burgner-Kahrs, and R. J. Webster III, “Design, fabrication, and testing of a needle-sized wrist for surgical instruments,” *ASME Journal of Medical Devices*, 2016.

Conference Papers

- [C1] S. A. Bothner[†], **P. A. York**[†], P. C. Song, and R. J. Wood, “A compact laser-steering end-effector for transoral robotic surgery,” in *IEEE International Conference on Intelligent Robots and Systems*, 2019.
- [C2] **P. A. York** and R. J. Wood, “Nitinol living hinges for millimeter-sized robots and medical devices,” in *IEEE International Conference on Robotics and Automation*, 2019, pp. 889–893.
- [C3] **P. A. York** and R. J. Wood, “A geometrically-amplified in-plane piezoelectric actuator for mesoscale robotic systems,” in *IEEE International Conference on Robotics and Automation*, 2017, pp. 1263–1268.

- [C4] **P. A. York**, P. J. Swaney, H. B. Gilbert, and R. J. Webster III, “A wrist for needle-sized surgical robots,” in *IEEE International Conference on Robotics and Automation*, 2015, pp. 1776–1781.
- [C5] D. P. Losey[†], **P. A. York**[†], P. J. Swaney, J. Burgner, and R. J. Webster III, “A flexure-based wrist for needle-sized surgical robots,” in *SPIE Medical Imaging*, 2013.

Grants

DARPA “SHRIMP: An Integrative Exploration of Actuation and Power Systems for Microrobots” (\$1,231,000, 9/2018-9/2021). I contributed to the initial ideation and helped draft the technical aims for this grant proposal.

Army Research Office DURIP “A Scanning Laser Doppler Vibrometer for Characterizing and Optimizing High Performance Materials, Actuators, and Impulsive Systems” (\$275,000, 6/2016-7/2016). I conducted significant background research and co-wrote all portions of this grant proposal with my dissertation advisor.

Patents

- [P1] **P. York**, S. Bothner, and R. J. Wood, *Compact laser-steering end-effector*, US Patent App. 20/57,684, 2020.
- [P2] P. J. Swaney, **P. A. York**, H. B. Gilbert, R. J. Webster III, A. W. Mahoney, and P. Wellborn, *Surgical device tip with arc length varying curvature*, US Patent App. 16/176,068, 2019.

Honors and Awards

NSF Graduate Research Fellowship (2014-2017)

Undergraduate Awards: Design and Controls Award (2014), Senior Design Team Award (2014), Cornelius Vanderbilt Scholar (2010-2014)

Teaching

Introduction to Robotics, Harvard University **2020**

I prepared and presented two guest lectures for my dissertation advisor’s robotics class, covering inverse kinematics and Jacobians, respectively.

Laboratory Electronics, Harvard University **2017-2019**

I taught this wide-ranging electronics course in Summer 2019. In evaluations (available on request), students unanimously described the course as “outstanding” and “strongly agreed” that I was an effective teacher. The course covers the essentials of analog, digital, and micro electronics, culminating in the construction of a micro computer from raw integrated circuits. I previously served as a teaching assistant for the Summer 2017 and Spring 2018 versions of the course.

Engineering the Acoustical World, Harvard University **2018**

For this new course taught by my dissertation advisor, I devised an experimental setup to measure the vibrations in a guitar body that result from different strings being plucked. The visualizations that I created from the measurements were part of a lesson on standing waves and Hemholtz resonators.

The Joy of Electronics, Harvard University **2016**

I helped students in this project-based electronics course learn the fundamentals of digital and analog electronics through hands-on lab exercises.

Computer Aided Design, Vanderbilt University **2013**

I held office hours and graded weekly assignments for this introductory course. Students learned the basics of 3D solid modeling by completing weekly assignments of increasing complexity, culminating in an end-of-term capstone project.

Mentorship

Graduate students

Simon Bothner, MS, *A Snap-on Module for Endoscopic Rapid Scanning Laser Phonosurgery*

Professional Activities and Service

Memberships IEEE Student Member, Tau Beta Pi

Technical Reviews Science Robotics, Robotics and Automation Letters, Annals of Biomedical Engineering, Transactions on Mechatronics, Transactions on Robotics, Smart Materials and Structures, IROS